3. PRIME AND COMPOSITE NUMBERS

2025/26

Class: VI : MATHEMATICS

INTEGRATED† SOLUTIONS

01. 4 — Ans.-D

02 prime no. between 1 to 20
$= \{2, 3, 5, 7, 11, 13, 17, 19\}$
total = 8 — Ans: B

03 97 — Ans.-D

04 No. of prime no. between 1 to 100 = 25 — Ans: D

05 183 — Ans: C

06 $5 = 2 + 3$ — Ans: C

07 All primes are odd is false
Since 2 is prime but even — Ans: B

08 Twin primes between 1 to 100
$= (3,5), (5,7), (11,13), (17,19), (29,31),$
$(41,43), (59,61), (71,73)$
total = 8 — Ans-B

09 (23, 29) — Ans. C

10 Conceptual — Ans.-D

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JEE ADVANCED

11. Q 53, 59 — Ans: A, C

12 Statement I: True
Statement II: Conceptual (False) — Ans: C

13 1 — Ans: A

14 69 — Ans: B

15 100 = 59 + 41 — Ans: A

16 1 — Ans: 1

17 2 + 4 = 6 — Ans: 6

18 a) 25 (s)
b) 73 (t)
c) 24 (r)
d) 48 (q)
Ans: s, t, r, q

LEARNERS TASK (CUQ's)

01 111 — Ans: A

02 99 — Ans: D

03 Conceptual — Ans: D

04 Conceptual — Ans: D

05 3 + 5 = 8 (Even)
3 + 5 + 7 = 15 (odd) — Ans: C

06	2^n	(3) Ans: A
07	$2+4=6$ (Even) $2+4+6=12$ (Even)	Ans: A
08	Conceptual	Ans: D
09	Conceptual	Ans: D
10	$1+99=100$	Ans: A
	JEE MAINS LEVEL	
01.	$51=(3)^1\times(17)^1$ No. of factors $=(1+1)(1+1)=4$	Ans. C
02	prime triplets $\rightarrow (p, p+2, p+6)$ (or) $(p, p+4, p+6)$ $\therefore (13, 17, 19)$	Ans: A
03	Factors of $43=\{1, 43\}$ Sum $=1+43=44$	Ans: B
04	Conceptual	Ans. A
05	199	Ans. C
06	1	Ans. B
07	$2+0+1=3$	Ans: —
08	$236\boxed{7}+359\boxed{2}+457\boxed{2}$ $7+2+2=$ ——— $\boxed{1}\rightarrow$ odd	Ans: B

09 | 786[8] × 7896[3] × 457[8] (4)

8 × 3 × 8 = _____ [2] → Even Ans. B

10 | 21 Ans: B

11 | prime Numbers between 4 and 30

$= \{5, 7, 11, 13, 17, 19, 23, 29\}$

Sum = 5+7+11+13+17+19+23+29

= 124.

Ans: —

12. Given $a^2 - b^2$ = prime number

$\Rightarrow (a+b)(a-b)$ = prime numbers

For $a^2 - b^2$ to be a prime, one of the factors must be either −1 or 1.

(since prime Numbers factors only 1 and itself)

Possible cases (i) $a-b=1$

(ii) $a+b=1$ (Typical Context)

· Conclusion: $a-b=1$ Ans. B

13 | $a^2+b^2+2ab = (a+b)^2$, which is a perfect square

A) $a+b=6 \Rightarrow (a+b)^2 = 36$, not a prime no.

B) $a+b=5 \Rightarrow (a+b)^2 = 25$, not a prime no.

C) $a+b=7 \Rightarrow (a+b)^2 = 49$, not a prime no.

Ans: D

14 option verification (5)

53

Ans: C

15 A) $K=1 \Rightarrow 2^K+1 = 2^1+1 = 3$, prime

$K=2 \Rightarrow 2^2+1 = 5$, prime

Ans: A

JEE ADVANCED LEVEL

01 Even number $\rightarrow 2n$

odd number $\rightarrow 2n+1$

Ans: A, B

02 13, 19

Ans: B, D

03 factors of $63 = \{1, 3, 21, 7, 9, 63\}$

prime nos $= \{3, 7\}$

total $= 2$

Ans: ____

04 Statement I: $15 = 3+5+7$ (True)

Statement II: 3(prime no) $+ 2$(prime no) $= 59$

$3(7) + 2(19) = 59$ (True)

Ans: A

05 A) $20 = 2^2 \times 5^1$

No. of factors $= (2+1)\times(1+1) = 3\times 2 = 6$ (Even)

B) $6 = 2^1 \times 3^1$

No. of factors $= (1+1)(1+1) = 2\times 2 = 4$ (Even)

C) $15 = 3^1 \times 5^1$

No. of factors $= (1+1)(1+1) = 2\times 2 = 4$ (Even)

D) All the above

Ans: ~~A, B, C~~ D

06 Factors of 84 = {1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84} (6)

Comp prime factors = {2, 3, 7}

Ans: A

07 4−1 = 3, 6−1 = 5, 8−1 = 7

∴ (3, 5, 7) are prime triplets (Exceptional Case)

Ans: B

08 Factors of a = {1, 9}

least factor = 1

∴ Difference = 1−1 = 0

Ans: 0

09 73 + 37 = 110

Ans: 73 & 37

10 a) 41 (q)

b) (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43)

total = 6 (p)

c) prime no. below 15 = {2, 3, 5, 7, 11, 13}

Sum = 2 + 3 + 5 + 7 + 11 + 13 = 41 (q)

d) between 9 and 100 (r)

Ans: q, p, q, r

⟹ THE END ⟸